INSTALLATION MANUAL

DataNex Data-20
Digital Radio

REVISION #
DATE

EMS™ Wireless
A Division of EMS Technologies, Inc.

Installation Manual

The DataNex Data-20 Digital Radio is a wireless backhaul communication link used to replace multiple T1 transport lines between cell sites and base stations. The DataNex digital radio design allows carriers to use their existing spectrum more effectively in locations such as:

- Rural areas
- Highways connecting major cities
- Difficult topographies for T1 installation

DataNex “point-to-point” digital radios are spectrum-scalable, allowing them to deliver advanced modulation and digital processing with up to four (4) command channels.

About this Manual

This manual is designed for the advanced operator who is familiar with digital radio hardware and software technology. Its contents describes how to physically set up the equipment and configure it for basic operation.

Installation Tools & Equipment

You may need the following tools and equipment to properly install the DataNex Data-20 Digital Radios:

- Tower, pole, etc. for antenna location.
- Two (2) Antenna Systems
- RF cables for antenna
- T1 cables
- Power supply / Surge suppressor
- Adjustable wrench
- Medium flathead or phillips screwdriver

Package Contents

The DataNex Data-20 Digital Radio package includes the following:

- Set of two (2) Digital Radio Units:
  Data-20 B (Base)
  Data-20 M (Mobile)
- Operator's Manual
- Installation Guide
- Four (4) dog ears for 19" rack-mount capabilities
- Power cord: Two (2) 24/48 Isolated Input DC / AC cords
- Trunking cable (for multi-T1 units only)
- Interface cable for alarm reporting via open contact relays on BTS
- Two (2) SMA male to N-male interface cables
- Two (2) Type-N female bullets

UNPACKING THE DATA-20 DIGITAL RADIO

If you receive your DataNex digital radio in a damaged shipping carton, request that the carrier remain present while you unpack and inspect the equipment.

The digital radio is shipped in a tightly packed carton. To unpack it, follow these steps:

1. Carefully open the box and remove the DataNex Data-20 digital radio and accessory hardware kit.
2. Inspect the package contents to verify shipping accuracy.

   Refer to the package contents section on page 2 for details.

If the unit appears damaged, phone EMS *Wireless* Technical Support at 1.770.582.0555, ext.5310 or e-mail cs.wireless@ems-t.com.

Save all shipping materials until the Data-20 is installed and running normally as they may be needed to return the unit for any reason.

PRE-INSTALLATION

Before you install the DataNex Digital Radio, you must verify the following:

- **Site Survey**: ensure that a qualified technician has surveyed installation site facilities. Check that the product location will protect the units from weather, and that antennas are mounted properly.
- **Mounting Hardware**: ensure that you have the proper hardware to mount the antenna system, as well as the Data-20.
- **Cable Connections**: provide secure and undamaged cables and avoid cable interconnection length in excess of one (1) meter in strong RF environments.
- **Semi-Rigid Cables**: ensure that cables connecting the chassis components are secure and tightly attached. Check for any damage such as kinks or breaks in the copper sheath.

INSTALLATION

You must connect an antenna, attenuator, or load to the antenna port *before* operating the digital radio units to prevent damage to the transmitter

It is recommended that you simulate Data-20 configuration in a controlled laboratory environment to test and correct frequency settings prior to field installation.

To properly install the digital radio, follow these steps:

1. Install the antenna to be used with the Data-20. Refer to your antenna's installation manual for instructions.
2. Connect the antenna source as shown in Figure 1.

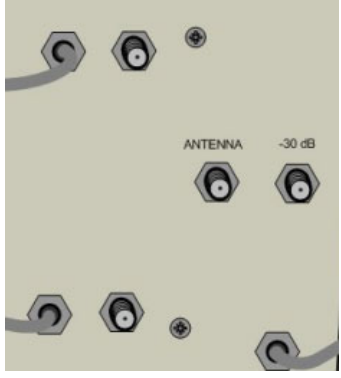

Figure 1: Antenna Connection

3. Mount the DataNex digital radio in a standard 19” cabinet using the dog ears as shown in Figure 2.

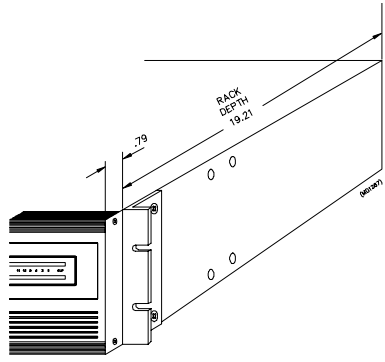

Figure 2: Rack Mount Installation

Leave adequate space above or below the unit for proper air ventilation.

4. Connect the appropriate T1 lines to the second chassis panel as shown in Figure 3.

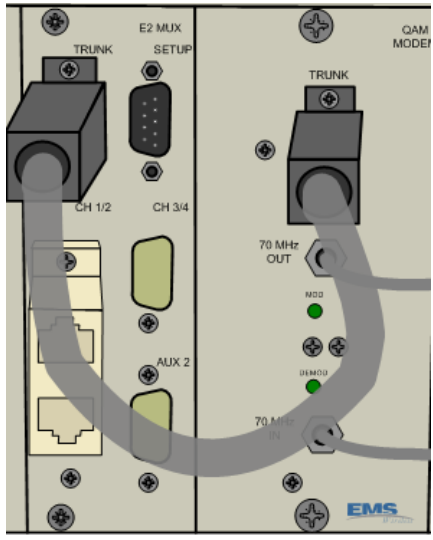

Figure 3: 2 T1 Connection

5. If the DataNex unit is equipped with multiple T1 configurations, connect the trunking cable. If the DataNex unit is configured for a single T1 line, continue with Step 5.

Before continuing with connecting the power source, ensure that the antenna port and other cables are secure to avoid damage to the unit.

6. Connect the DC power cords to the far left panel of the unit as shown in Figure 4. Connect the Red cable to the positive (+) source, and the Black cable to the ground (-).

Figure 4: Power Source Connection

The power supply must be isolated from the chassis ground.

The Data-20 unit powers on and auto-setup begins.

For detailed information concerning the installation, refer to your *DataNex Data-20 Operator's Manual*.

CONFIGURATION

To configure your digital radio for basic operation, follow these steps:

1. Begin configuration by choosing either the Data-20 B (Base) or M (Mobile) unit.
2. With the power source and antenna load connected, the Data-20 automatically radiates into the antenna.

Basic configuration assumes that the attenuation is good and the device is operating properly. For detailed configuration changes due to unacceptable antenna settings, refer to your *DataNex Data-20 Operator's Manual*.

3. During auto-setup, operational status indicators on the Data-20 appear red. When setup completes, the top two (2) and bottom two (2) indicators appear green.

4. Locate the LCD screen and controls on the front of the Data-20, as shown in Figure 5.

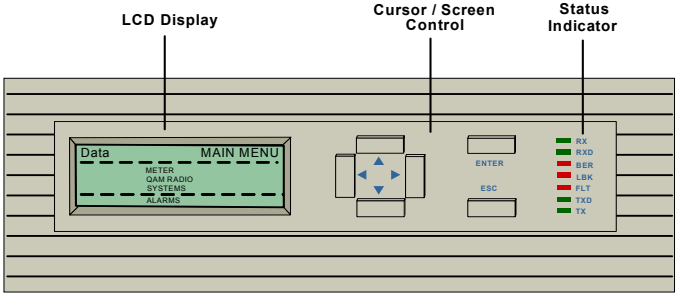

Figure 5: Data-20 Control Panel

These controls select the power-up state and control the radiating functions of the unit.For initial installation, the configurations for the Data-20 are preset. Use the Data-20 Controls to configure the frequency only.

5. The main menu appears on system power-up. Scroll to **QAM Radio** using the Up  and Down  arrow keys, and then press ***ENTER*** (see Figure 6).

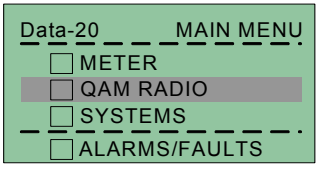

Figure 6: QAM Radio Selection

The QAM Radio Launch screen displays.

6. Select **CONFIGURE** by using the Left and Right arrow keys, and then press ***ENTER***.
   The QAM Radio Control Status displays.
7. Use the Up and Down arrow keys to scroll to the Transmit (Tx) frequency setting.
8. Set the Tx frequency by entering the desired numeric value digit by digit using the four (4) arrow keys, as appropriate, then press***ENTER***.
9. Scroll to the Recieve (Rx) setting and enter the desired numeric value in the same manner. Then press ***ENTER***.
   The LO screen displays.
10. Press ***ESCAPE*** to exit the LO screen..

If you do not save changes to the settings, the system will revert back to the last saved value on power failure. For initial setup, these values are factory defaults.

11. Locate the second DataNex unit control panel and scroll to **QAM Radio** using the Up and Down arrow keys. Then press ***ENTER.***
    The QAM Radio Launch screen displays.
12. Select **CONFIGURE** by using the Left and Right arrow keys, and then press ***ENTER***.
    The QAM Radio Control Status displays.
13. Use the Up and Down arrow keys to scroll to the Transmit (Tx) frequency setting.

14. Set the Tx frequency by entering the desired numeric value digit by digit using the four (4) arrow keys, as appropriate, then press ***ENTER***.
15. Scroll to the Recieve (Rx) setting and enter the desired numeric value in the same manner. Then press ***ENTER***.

Ensure that the Tx and Rx Settings are the reverse of the original unit.

The LO screen displays.

16. Press ***ESCAPE*** to exit the LO screen.

    The Save Settings Screen displays. Using the arrows, select **YES** and press ***ENTER***
17. Choose **STATUS** from the QAM configuration screen. Select **MODEM** and press ***ENTER***.

    The Data-20 Status screen displays, detailing the unit's performance.
18. Repeat the configuration process with the second Data-20 unit. Ensure that the Rx and Tx frequency settings are the reverse of the original unit.
19. Locate the LED Status Indicators (see Figure 7).

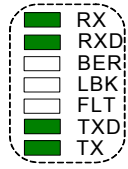

Figure 7: LED Status Indicators

When indicators are green the Data-20 is operating properly.

Data-20 units may show red indicators immediately after initial setup. Locate and press the *Reset* button on the back of the malfunctioning unit. If indicators to not revert to green, consult the *Troubleshooting* section of the *DataNex Data-20 Operator's Manual.*

For detailed information about customizing the Data-20 configuration, see the *DataNex Data-20 Operator's Manual*.